



CLEARING THE AIR

2019 APCD Workshop Series

Are you curious about the air you breathe, what's in it, and how it's protected?

Join us at our free monthly workshops and get an in-depth look at how we keep the air clean.

FEBRUARY 18	JULY 15
MARCH 18	AUGUST 19
APRIL 15	SEPTEMBER 16
MAY 20	OCTOBER 21
JUNE 17	NOVEMBER 18

6 p.m-7:30 p.m. | Louisville Free Public Library, 301 York St.

For more info, go to www.louisvilleky.gov/APCD
(502) 574-6000

CLEARING THE AIR

2019 APCD Workshop Series



The [APCD Workshop Series](#) seeks to:

- Increase the community's understanding of Louisville's air and of APCD's many functions
- **EMPOWER** citizens
- Provide a more informal forum for dialogue, Q&A and feedback
- Continue with community engagement efforts

CLEARING THE AIR

2019 APCD Workshop Series



Today's workshop seeks to:


1. Help the community better understand the relationship between air quality and greenhouse gases (GHGs).
2. Review Louisville's GHG inventory.
3. Explore ways the community and local government can work together to achieve GHG reductions.

CLEARING THE AIR

2019 APCD Workshop Series



Remember...

- There are **NO** silly questions
- Public Participation = 
- Interactive/informal workshop
 - Ask questions as they come to mind
 - Feedback? Email Clearingtheair@louisvilleky.gov



Air Quality and Greenhouse Gases

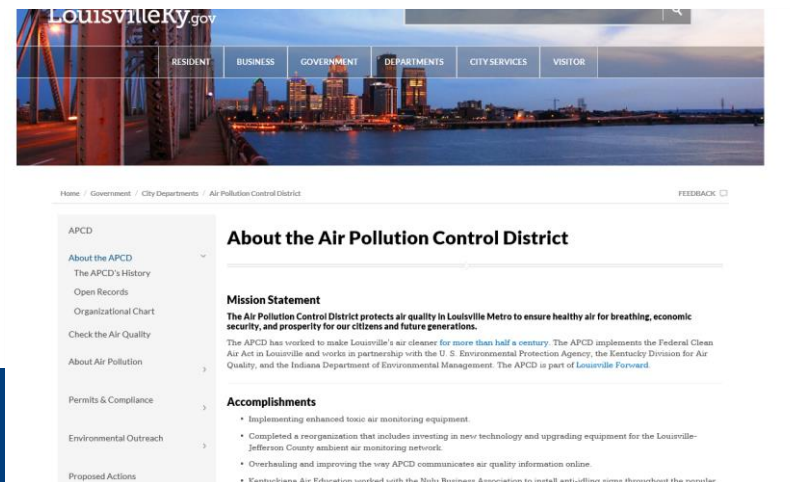
Air Pollution Control District
May 20, 2019



Air Pollution Control District

Mission Statement:

*The Air Pollution Control District **protects air quality in Louisville Metro to ensure healthy air for breathing, economic security, and prosperity for all Louisvillians.***



Who We Are

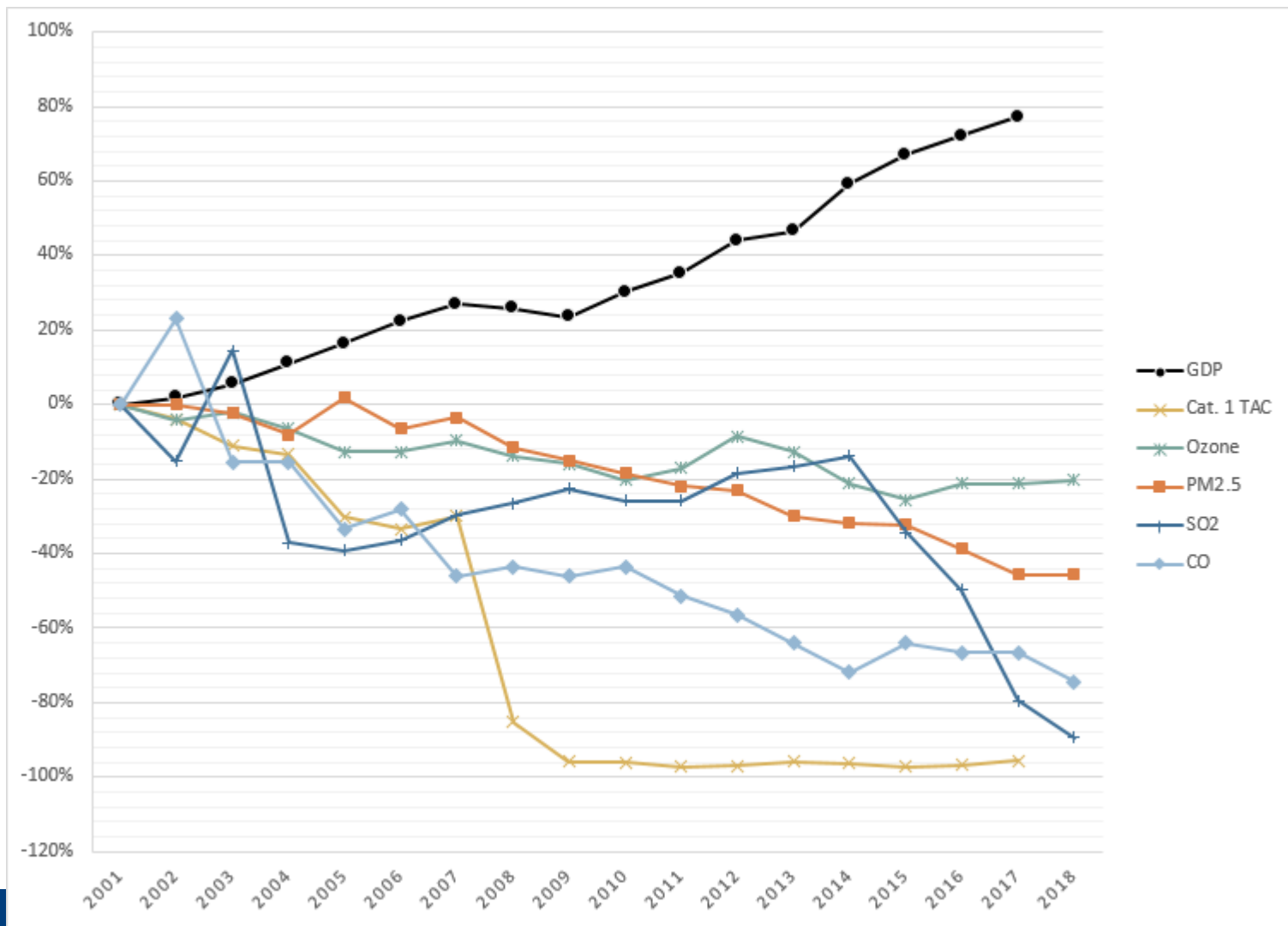
- To whom do we report?
 - The Community
 - Environmental Protection Agency
 - Ky. Division for Air Quality
 - Air Pollution Control Board
 - Louisville Metro Government
- How are we funded?
 - Federal Grants
 - Permit Fees
 - Emission Fees
 - Program Fees
 - Louisville Metro General Fund

APCD Goals

Ensure healthy air for
breathing

Help local businesses meet
air quality standards

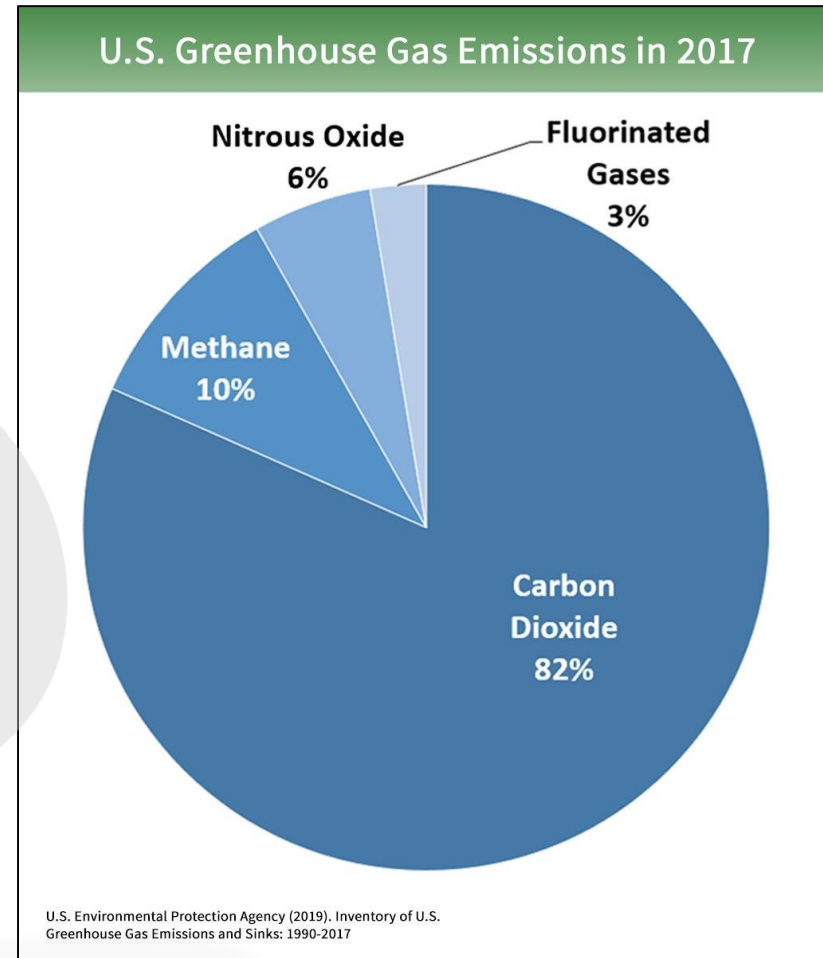
Air Quality in Louisville



Greenhouse Gases

What are GHGs?

- GHGs are gases that trap heat within the atmosphere
- Main greenhouse gases in U.S.
 - Nitrous Oxide
 - Fluorinated Gases
 - Methane
 - Carbon Dioxide



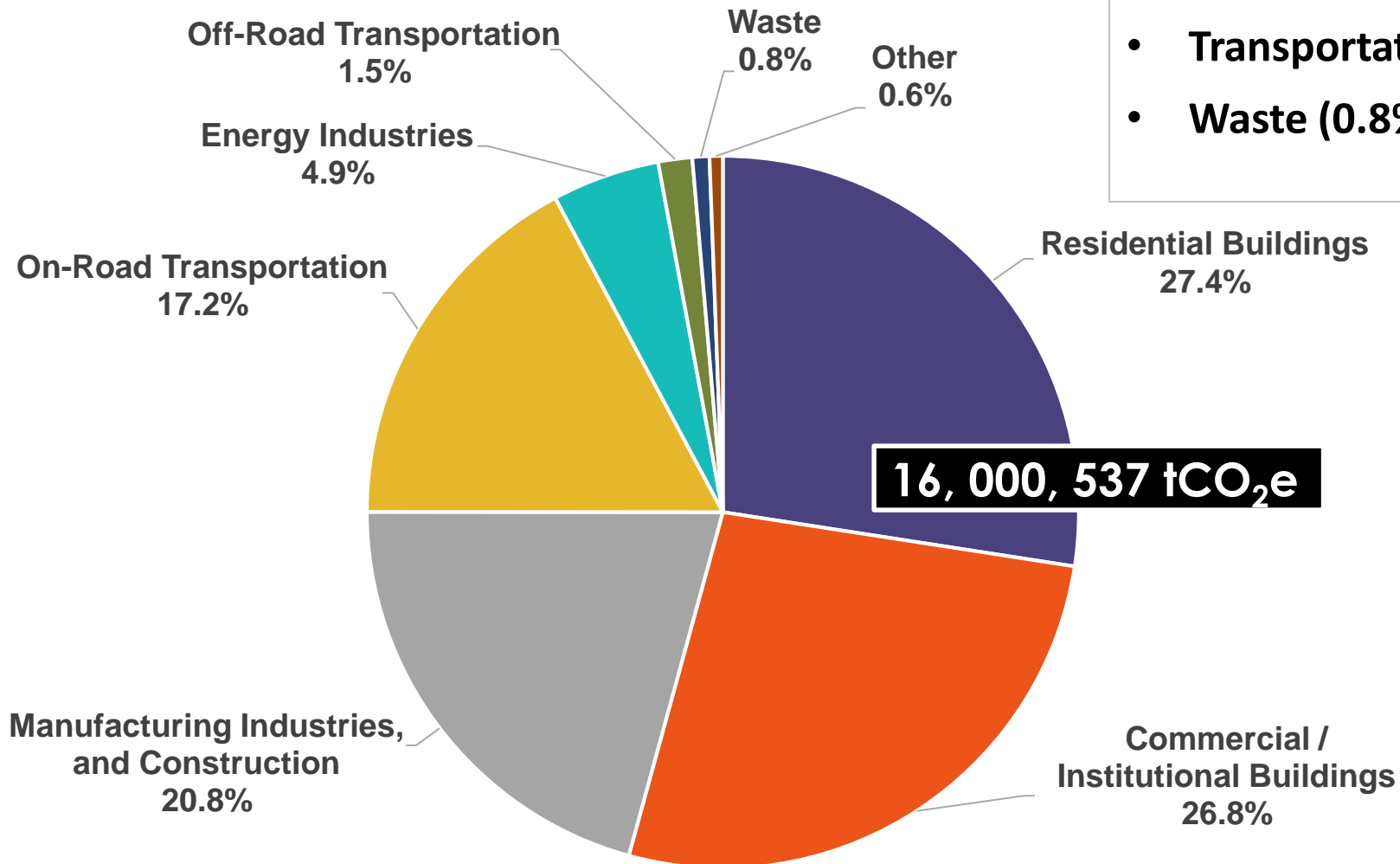
GHG Inventory

- What is it?
 - An accounting of the emissions that contribute to the global greenhouse effect and cause climate change.
- Why conduct a GHG inventory in Louisville?
 - Global Covenant of Mayors commitment
 - Improve the health of our residents
 - Improve quality of life for future generations
 - Sustain Louisville 2013 – Goal 3: Address climate change impacts

GHG Inventory Results

2016 Core GHG Emissions

- Energy (80.5%)
- Transportation (18.7%)
- Waste (0.8%)



GHG Emissions: 2010 vs. 2016



GHG Inventory Results

GHG Inventory Results (tCO2e)		
2010 Baseline	2016	Change From Baseline
17,803,067	16,000,537	-10.1%

Comparing Cities

City	Per Capita GHG Emissions
Columbus, OH	13.2 tCO ₂ e
Austin, TX	15.5 tCO ₂ e
Nashville, TN	20.1 tCO ₂ e
Louisville, KY	20.9 tCO₂e
Knoxville, TN	21.7 tCO ₂ e
Memphis, TN	22.0 tCO ₂ e
St. Louis, MI	22.9 tCO ₂ e
US National Average	16.5 tCO₂e

Comparing per capita emissions among cities is complex:

- Data availability varies
- Differing calculation methodologies
- Energy sources vary
- Study area boundaries
- Economic drivers

Air Quality and GHGs

Criteria Pollutants of the Clean Air Act

- Endanger public health and welfare
- Come from a variety of sources
- Common throughout the United States

Carbon Monoxide

Lead

Sulfur Dioxide

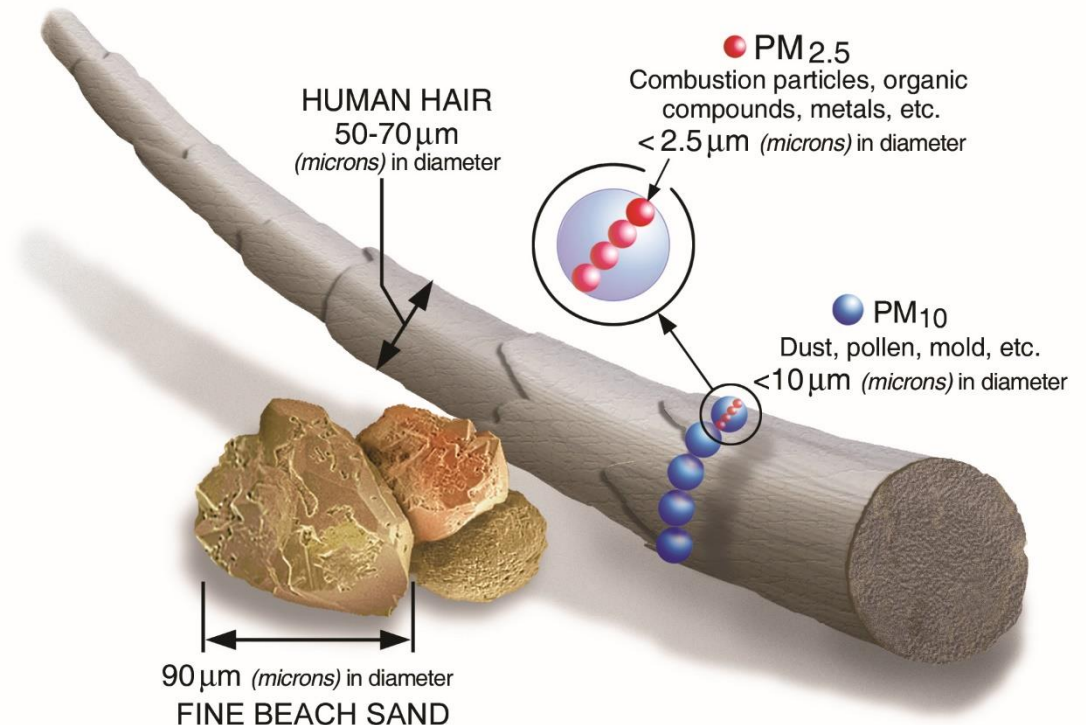
Oxides of Nitrogen

Particulate Matter

Ozone

What are Fine Particulates?

- A complex mixture of particles and liquid droplets found in the air
- Categories:
 - Coarse Particles (PM_{10})
 - Fine Particles ($PM_{2.5}$)
- Health effects:
 - Aggravated asthma
 - Decreased lung function
 - Increased respiratory symptoms
 - Irregular heartbeat
 - Heart attacks



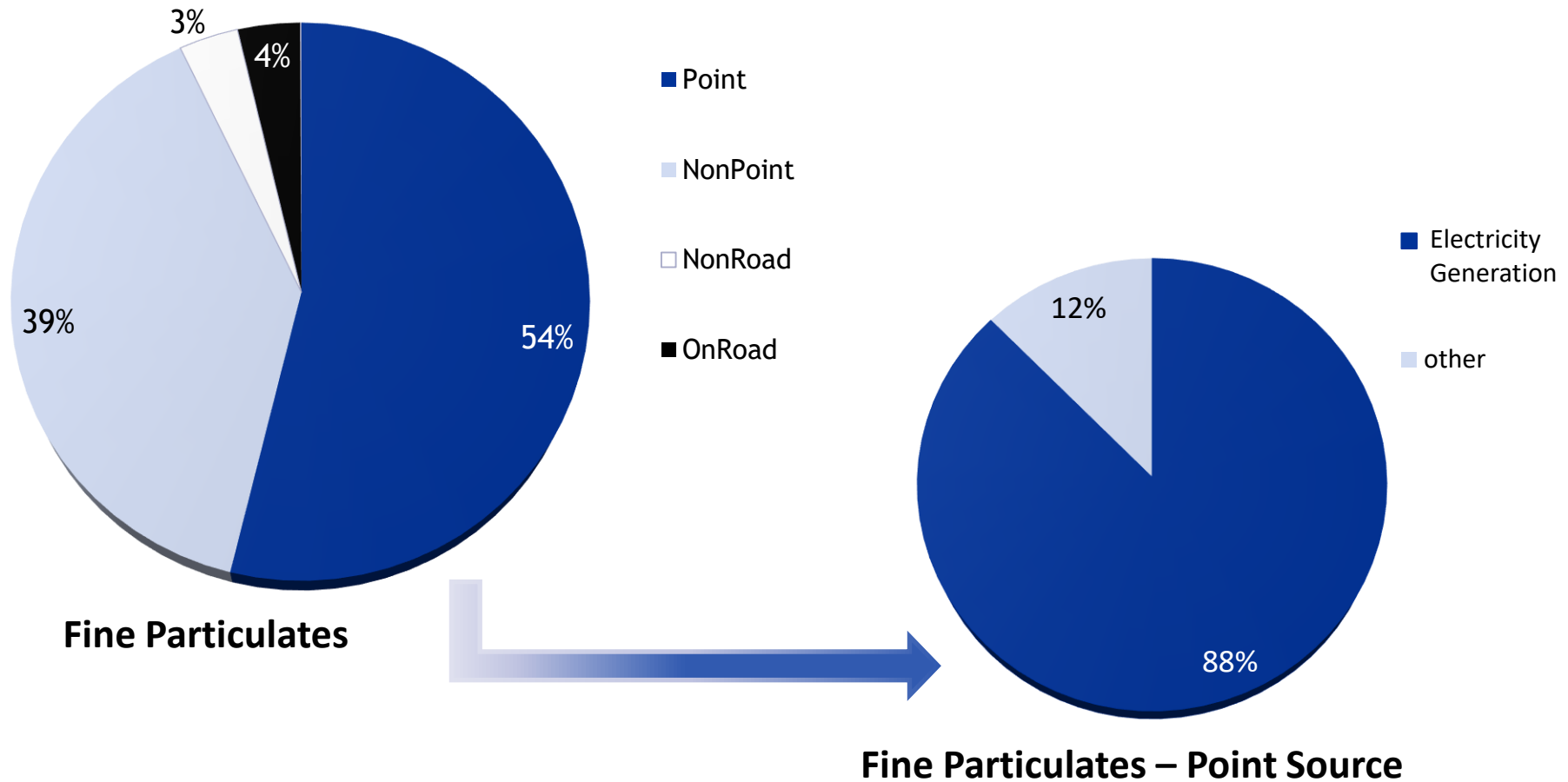
What are the sources?*

Sources <i>directly</i> emitting Fine Particulates (PM)	Sources and/or sectors within the GHG Inventory that emit Fine Particulates (PM)
Coal-fired Power Plants	Buildings (Energy Use) <ul style="list-style-type: none">- Commercial- Residential
Diesel Engines	OnRoad and NonRoad Transportation
Construction Sites	Construction



**Not an exhaustive list*

Louisville's Fine Particulates Inventory

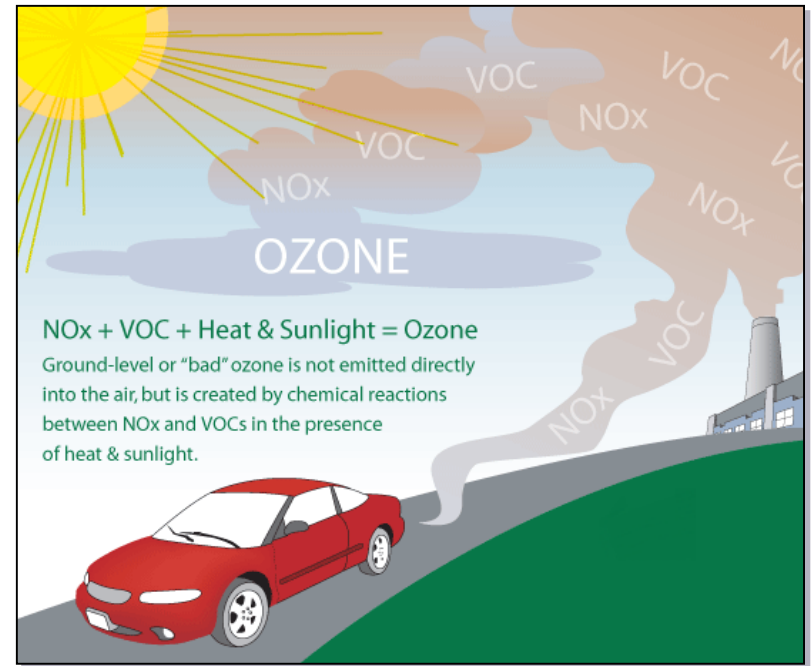


What is Ozone (O₃)?

NO_x + VOCs + Sunlight = O₃


HEAT

- Louisville's Ozone season: March-October
- Health effects:
 - Shortness of breath
 - Inflammation of airways
 - Aggravate lung disease
 - Increase frequency of asthma attacks



Volatile Organic Compounds (VOCs)



- What are they?
 - Organic compounds that easily become vapors or gases
 - Contributes to formation of ground-level ozone (“ozone precursor”)
- Not a criteria pollutant
- Many VOCs are also air toxics
- Where does it come from?
 - Gasoline engines and fueling
 - Solvents, paints, consumer products

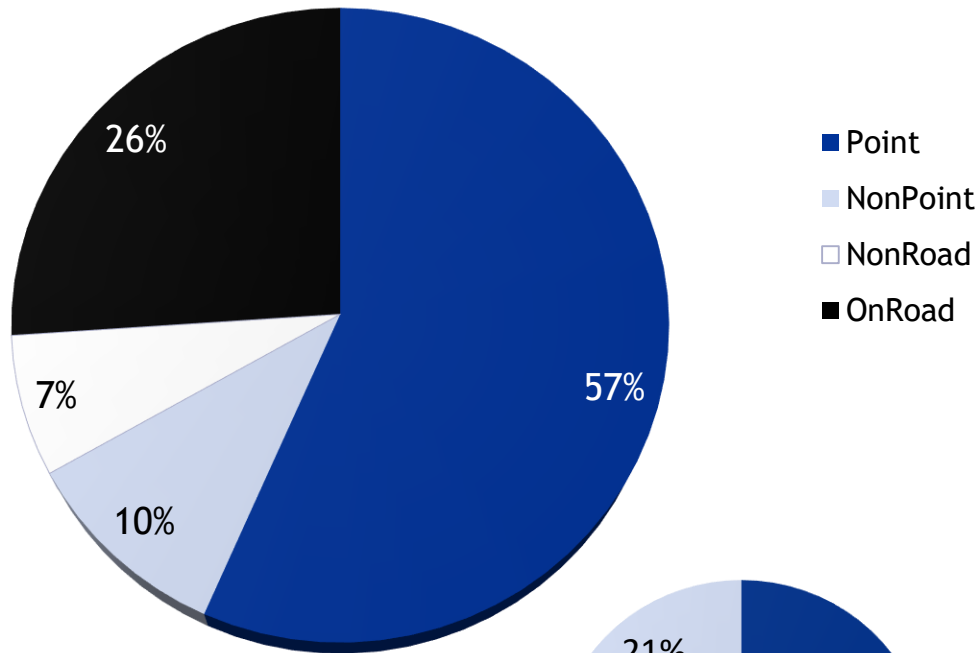
What sources contribute to ozone?*

Sources of ozone precursors (NOx and VOCs)	Sources and/or sectors within the GHG Inventory contributing ozone precursors
Coal-fired Power Plants (NOx)	Buildings (Energy Use) <ul style="list-style-type: none">- Commercial- Residential
Diesel Engines (NOx)	OnRoad and NonRoad Transportation
Landfills (VOCs)	Construction

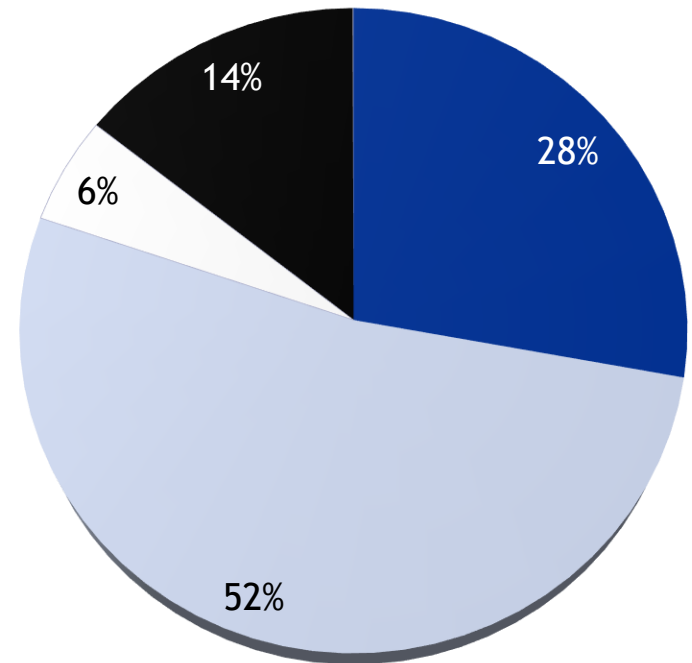
**Not an exhaustive list*

Louisville's Ozone Precursor Inventory

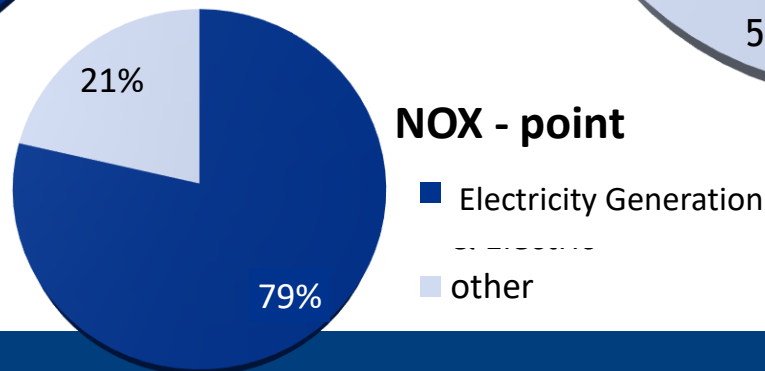
Oxides of Nitrogen (NOx)



Volatile Organic Compounds (VOCs)



NOx - point

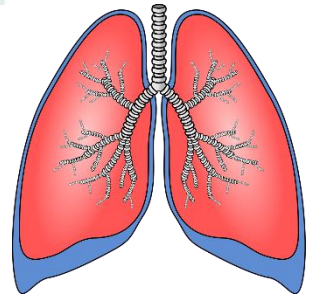


Current NAAQS Status

Pollutant	Standard	Averaging Time	Attainment Status
Carbon Monoxide	9 ppm	8-hour	Attainment
	35 ppm	1-hour	Attainment
Lead	0.15 $\mu\text{g}/\text{m}^3$	Rolling 3-month Average	Attainment
Nitrogen Dioxide	53 ppb	Annual Average	Attainment
	100 ppb	1-hour	Attainment
Particulate Matter (PM10)	150 $\mu\text{g}/\text{m}^3$	24-hour	Attainment
Particulate Matter (PM2.5)	12.0 $\mu\text{g}/\text{m}^3$	Annual Average	Attainment
	35 $\mu\text{g}/\text{m}^3$	24-hour	Attainment
Ozone	0.070 ppm	8-hour	Nonattainment
Sulfur Dioxide	75 ppb	1-hour	Partial County Nonattainment

How can reducing GHGs impact health?

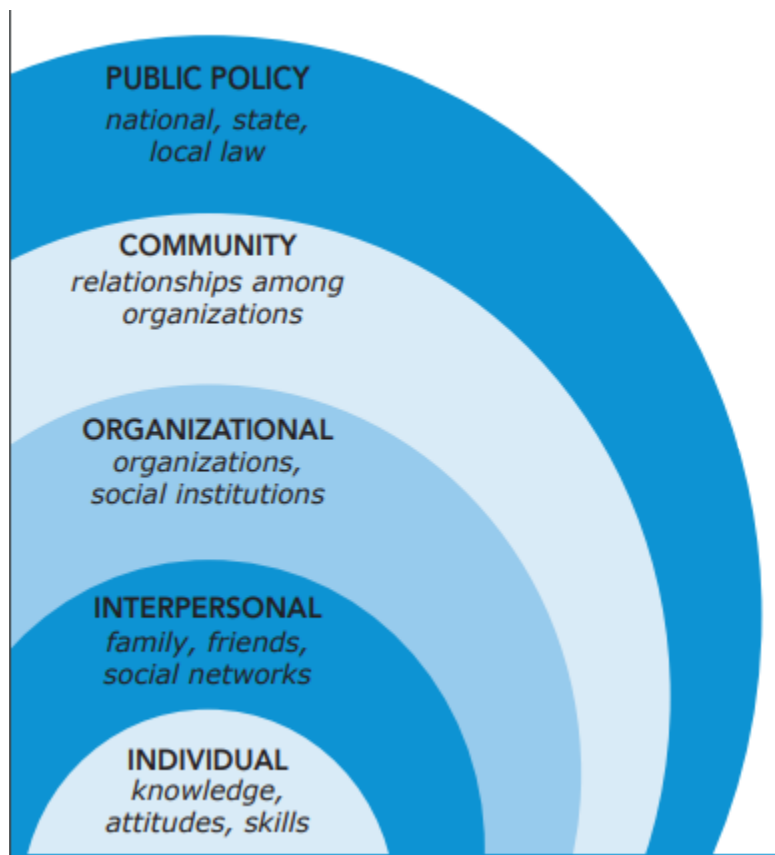
- Reduces criteria pollutants
 - Improves cardiovascular health
 - Reduces asthma incidence
- Reduces climate impacts
 - Heat related illness and mortality
 - Extreme weather-related events (*e.g.* flooding, tornados, storms)



Moving Forward

Socio-Ecologic Model*

- Idea that there are steps to protect health and improve air quality can happen at all levels, from Government to Individuals.



* A concept borrowed from the Center For Health Equity's [2017 Health Equity Report](#). Access the report to learn more about the socio-ecologic model and how it was used to recommend best practices for public health.



**CENTER FOR
HEALTH EQUITY**
A Division of Public Health and Wellness

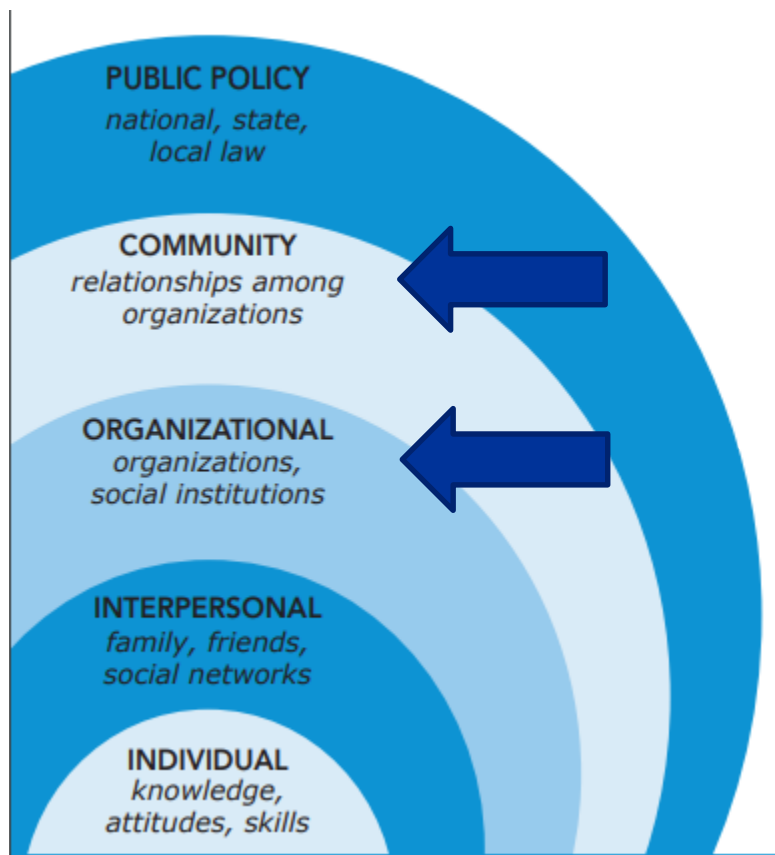


Public Policy



- Established the [Energy Project Assessment District \(EPAD\) Program](#)
- Louisville Metro Gov't
 - Global Covenant of Mayors
 - Climate Mayors
 - Cities uphold climate commitments despite U.S. withdraw from Paris Climate Agreement

Community and Organizational



- [LCAN \(Louisville Climate Action Network\)](#)

- Tree planting initiatives



- [#cool502](#)

GREENING | COOLING | CONSERVING

- [Cool Roof Rebate Program](#)
- [Green Infrastructure Program](#)

Interpersonal and Individual

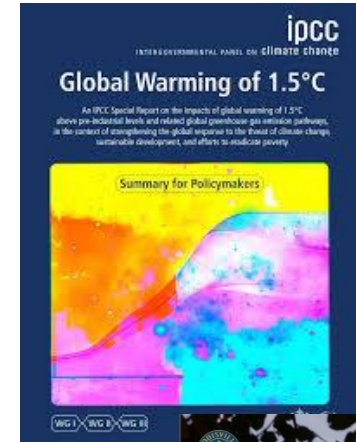


- Mode Shifts:
 - TARC electric buses, LouVelo bikeshare, motorized scooters, walking, [EV adoption](#), etc.
- [Idle Free program](#)
- [Grow More Mow Less](#)
- [Lawn Care for Cleaner Air](#)

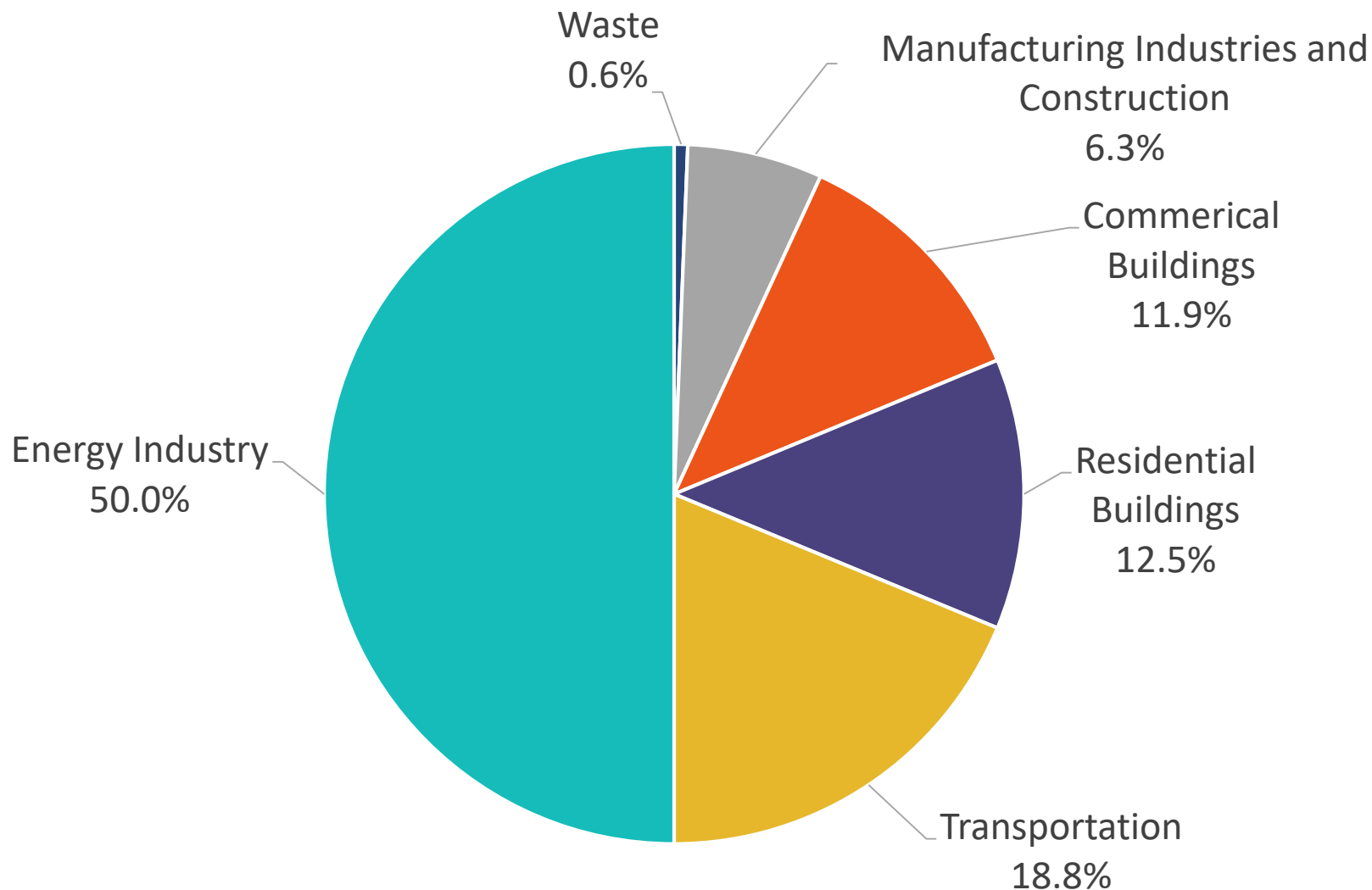


GHG Reduction Goal

- Reduce GHG emissions by 80% by 2050
- [IPCC 2018 report](#) states that we need to act quickly
 - 80% is science based target to ensure global temperature rise is below 2° C
- Identify GHG reduction opportunities for each sector



GHG Reduction Opportunities by Sector



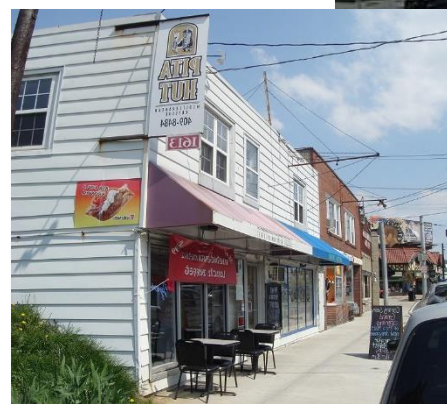
Potential GHG Reduction Strategies

- Focus on 3 sectors:

1. Residential Sector

2. Commercial Sector

3. Transportation sector



Potential GHG Reduction Strategy: Residential

- **Decrease residential emissions by 1,876,600 tCO₂e**
- Examples:
 - Programable thermostats and Energy Star appliances
 - 25% of homes install solar PV systems

Potential GHG Reduction Strategy: Transportation

- **Decrease transportation emissions by 2,814,900 tCO₂e**
- **Examples:**
 - 55% of passenger trips are electrified
 - Increase transit accessibility, improve service frequency
 - Enhance commuter trips reduction, parking management and ride sharing programs

Potential GHG Reduction Strategy: Commercial

- **Decrease commercial emissions 1,782,775 tons of CO₂e**
- **Examples:**
 - 25% install solar PV systems
 - Commercial building Energy Star benchmarking program
 - Building benchmarking – building owners track energy use via Energy Star's free online tool

Other ideas?



Questions?

Louisville Metro Air Pollution Control District

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(502) 574-6000

www.louisvilleky.gov/APCD

Keith H. Talley Sr., Director

Resources

Air Pollution Control District

Louisvilleky.gov/APCD

Intergovernmental Panel on Climate Change (IPCC)

<https://www.ipcc.ch/>

Louisville Metro Office of Sustainability

louisvilleky.gov/government/sustainability

Louisville Greenhouse Gas Emissions Inventory

<https://louisvilleky.gov/government/sustainability/greenhouse-gas-inventory>

KAIRE

Helptheair.org

Facebook.com/helptheair

Twitter.com/helptheair

Lawn Care for Cleaner Air

Louisvilleky.gov/government/lawn-care-cleaner-air

Grow More Mow Less

Facebook.com/GrowMoreMowLess

Environmental Protection Agency (EPA)

<https://19january2017snapshot.epa.gov/climatechange.html>

Resources

EVolve KY

<http://evolveky.org/>

Louisville Grows

<http://www.louisvillegrows.org/>

Transit Authority of River City (TARC)

<https://www.ridetarc.org/>

U.S. Global Change Research Program 4th National Climate Assessment

<https://nca2018.globalchange.gov/chapter/air-quality>

MSD Green Infrastructure Program

<https://www.louisvillemsd.org/GreenMSD>

Bike Louisville

<https://louisvilleky.gov/government/bike-louisville>

Louisville Climate Action Network (LCAN)

<https://www.louisvillecan.org/>

Trees Louisville

<https://treeslouisville.org/>